WHAT IS CLAIMED IS:

1. A method for concatenating packets to be transmitted from a first node to a second node, the method comprising the steps of:

(a) receiving packets having at least one traffic characteristic from at least one input port;

(b) concatenating n received packets to form a concatenated packet; and

(c) transmitting the concatenated packet from the first node to the second node, characterized in that

the n received packets have a common traffic characteristic and n is determined based on the common traffic characteristic.

2. The method of claim 1 wherein the concatenated packet is transmitted through a channel in a communication network, the common traffic characteristic requires a delay of less than p milliseconds, and the concatenated packet comprises a common header, a content information part for each of the n received packet and a payload for each of the n received packet.

3. The method of claim 2 wherein the channel has a bandwidth of B and n is determined by solving n from an equation of the form $(H + nI + \sum_{i=1}^{n} P_i)/B < p/1000$, where H is the size of the common header, I is the size of the content information part of each of the n received packets, and P_i is the size of the payload of the ith of the n received packets.

4. The method of claim 2 wherein the channel has a bandwidth of B and if P_{max} represents the maximum possible payload size of a received packet having the common traffic characteristic, n is determined by solving n from an equation of the form $(H + n(I + P_{max}))/B \leq p/1000$, where H is the size of the common header and I is the size of the content information part of each of the n received packets.

5. The method of claim 1 wherein the concatenated packet is transmitted through a channel in a communication network, the common traffic characteristic is delay insensitive, and the concatenated packet comprises a common header, a content information part for each of the *n* received packet and a payload for each of the *n* received packet.

6. The method of claim 5 wherein the maximum packet size allowed by the communication network is *M* bytes and *n* is determined by solving *n* from an equation of the form $H + nI + \sum_{i=1}^{n} P_i \leq M$, where *H* is the size of the common header, *I* is the size of the content information part of each of the *n* received packets, and P_i is the size of the payload of the *i*th of the *n* received packets.

7. The method of claim 5 wherein the maximum packet size allowed by the communication network is *M* bytes and if P_{max} represents the maximum possible payload size of a received packet having the common traffic characteristic, *n* is determined by solving *n* from an equation of the form $H + n(I + P_{max}) \leq M$, where *H* is the size of the common header, and *I* is the size of the content information part of each of the *n* received packets.

8. An apparatus for concatenating packets to be transmitted from a first node to a second node, the apparatus comprising:

(a) at least one input port for receiving packets;

(b) a traffic characteristic classifier for classifying and storing received packets of different traffic characteristics into different traffic characteristic groups in memory;

(c) a concatenated packets preparer for forming a concatenated packet from *n* received packets; and

(d) at least one output port for transmitting the concatenated packet to the second node, characterized in that

the n packets belong to one traffic characteristic group and n is determined based on the traffic characteristic of the one traffic characteristic group.

9. The apparatus of claim 8 wherein the concatenated packet is transmitted through a channel in a communication network, the n packets belong to the one traffic characteristic group that requires a delay time of less than p milliseconds, and the concatenated packet comprises a common header of H bytes, a content information part of I bytes for each of the n received packets, and a payload of P_i bytes for ith of the n received packets.

10. The apparatus of claim 9 wherein the channel has a bandwidth of B and n is determined by solving n from an equation of the form $(H + nI + \sum_{i=1}^{n} P_i)/B < p/1000$.

11. The method of claim 9 wherein the channel has a bandwidth of B and if P_{max} represents the maximum possible payload size of a received packet having the common traffic characteristic, n is determined by solving n from an equation of the form $(H + n(I + P_{max}))/B \leq p/1000$.

12. The apparatus of claim 8 wherein the concatenated packet is transmitted through a channel in a communication network, the n packets belong to the one traffic characteristic group that is delay insensitive, and the concatenated packet comprises a common header of H bytes, a content information part of I bytes for each of the n received packets, and a payload of P_i bytes for ith of the n received packets.

13. The apparatus of claim 12 wherein the maximum packet size allowed by the communication network is M bytes and n is determined by solving n from an equation of the form $H + nI + \sum_{i=1}^{n} P_i \leq M$.

14. The method of claim 12 wherein the maximum packet size allowed by the

communication network is M bytes and if P_{max} represents the maximum possible payload size of a received packet having the common traffic characteristic, n is determined by solving n from an equation of the form $H + n(I + P_{max}) \leq M$.